IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1 through 109 (Canceled)

110. (Currently amended) A system to actuate downhole tools ~~by light~~, comprising:

a downhole tool adapted to be deployed in a wellbore;

an optical transmitter optically connected to the downhole tool through an optical fiber;

the optical transmitter adapted to transmit an optical signal through the optical fiber with a predetermined characteristic;

an optical receptor located downhole to receive the optical signal, the optical receptor having sufficient processing capability to verify the optical signal has the correct predetermined characteristic; and

wherein upon verification of the correct predetermined characteristic by the optical receptor the downhole tool is activated in response to reception of the optical signal.

111. (Previously presented) The system of claim 110, wherein the optical signal comprises a specific number of optical pulses.

112. (Previously presented) The system of claim 111, wherein the optical signal comprises at least one pulse with a specific time duration.

113. (Previously presented) The system of claim 111, wherein the optical signal comprises at least one pulse of light at a specific intensity, frequency, wavelength, or amount.

114. (Previously presented) The system of claim 110, wherein the downhole tool is selected from the group consisting of a packer, a perforating gun, a valve, a sampler, a sensor, a pump, a screen, a chemical cutter, a plug, a detonator, or a nipple.

115. (Previously presented) The system of claim 110, wherein a receptor receives the optical signal, verifies the optical signal is a valid triggering signal, and subsequently enables the activation of the downhole tool.

116. (Previously presented) The system of claim 115, wherein:

the receptor comprises a microprocessor, storage, and a controller;

the valid triggering signal is stored in the storage;

the microprocessor compares the optical signal to the valid triggering signal; and

the microprocessor activates the controller when the optical signal matches the stored valid triggering signal.

117. (Previously presented) The system of claim 110, wherein a plurality of downhole tools are functionally connected to the optical fiber so that each of the downhole tools may be activated in response to the reception of the optical signal.

118. (Previously presented) The system of claim 117, wherein a different optical signal activates different downhole tools.

119. (Currently amended) The system of claim 117, further comprising at least one optical filter functionally connected to the optical fiber that allows only light at a specific wavelength to pass therethrough to activate at least one of the plurality of downhole tools ~~a downhole tool~~.

120. (Currently amended) The system of claim 117, further comprising at least one coupler functionally connected to the optical fiber that diverts only light at a specific wavelength towards at least one of the plurality of downhole tools ~~a downhole tool~~ to activate such downhole tool.

121. (Previously presented) The system of claim 110, wherein:

the optical signal is received by at least one photodiode;

the at least one photodiode converts the optical signal into electrical energy; and

the electrical energy is transmitted to an initiator circuit to activate the downhole tool.

122. (Previously presented) The system of claim 110, wherein:

the optical signal is transmitted into an optically reactive chemical chamber;

the chamber contains an optically reactive substance that chemically reacts when subjected to light; and

the chemical energy is transferred to activate the downhole tool.

123. (Previously presented) The system of claim 122, wherein the chamber includes an environment conducive to chemical reaction of the substance to light.

124. (Previously presented) The system of claim 122, wherein the reaction is one of heating, exploding, or deteriorating.

125. (Previously presented) The system of claim 110, wherein:

the optical signal is converted into an electrical signal and is then transmitted into a piezoelectric stack that expands when exposed to electrical energy; and

the expansion of the stack is used to activate the downhole tool.

126. (Previously presented) The system of claim 110, further comprising a casing collar locator used to determine the depth of the downhole tool.

127. (Currently amended) A method to actuate downhole tools ~~by light~~, comprising:

deploying a downhole tool in a wellbore;

optically connecting the downhole tool to an optical transmitter through an optical fiber;

transmitting an optical signal with a predetermined characteristic from the optical transmitter through the optical fiber;

receiving the optical signal downhole at an optical receptor having sufficient signal processing capability to verify the optical signal has the predetermined characteristic; and

upon verification by the optical receptor, activating the downhole tool in response to reception of the optical signal.

128. (Previously presented) The method of claim 127, wherein the transmitting step comprises transmitting an optical signal including a specific number of optical pulses.

129. (Previously presented) The method of claim 127, wherein the deploying step comprises deploying the downhole tool as part of a logging system.

130. (Previously presented) The method of claim 127, wherein the deploying step comprises deploying the downhole tool as part of a permanent completion.

131. (Previously presented) The method of claim 127, wherein the deploying step comprises deploying the downhole tool as part of a coiled tubing system.

132. (Previously presented) The method of claim 127, further comprising functionally connecting a plurality of downhole tools to the optical fiber so that each of the downhole tools may be activated in response to the reception of the optical signal.

133. (Currently amended) The method of claim 132, further comprising functionally connecting at least one optical filter to the optical fiber, the optical filter allowing only light at a specific wavelength to pass therethrough to activate at least one of the plurality of downhole tools ~~a downhole tool~~.

134. (Currently amended) The method of claim 132, further comprising functionally connecting at least one coupler to the optical fiber, the coupler diverting only light at a specific wavelength towards at least one of the plurality of downhole tools ~~a downhole tool~~ to activate such downhole tool.

135. (Previously presented) The method of claim 127, further comprising:

receiving the optical signal at an at least one photodiode, the at least one photodiode converting the optical signal into electrical energy; and

transmitting the electrical energy to an initiator circuit to activate the downhole tool.

136. (Previously presented) The method of claim 127, further comprising:

transmitting the optical signal into an optically reactive chemical chamber;

providing an optically reactive substance in the chamber that chemically reacts when subjected to light; and

transferring the chemical energy to activate the downhole tool.

137. (Previously presented) The method of claim 127, further comprising:

converting the optical signal into an electrical signal;

transmitting the electrical signal into a piezoelectric stack that expands when exposed to electrical energy; and

utilizing the expansion of the stack to activate the downhole tool.

138. (Previously presented) The method of claim 127, further comprising determining the depth of the downhole tool by using a casing collar locator.